



Fall 2003, Newsletter #7

I hope that by now you have all survived the hype about Mars. Early Wednesday morning, August 27, Mars was as close to Earth as it had been since 60,000 years ago. Great, but it was still 35 million miles away. Mars kept its distance.

In rough and round numbers that you might remember, Earth circles with a radius of 1 AU (almost 100 million miles) around our Sun. Mars orbits at 1.5 AU, and takes about 2 (earth) years to do that. If orbits were circles and in one plane, then the distance Earth-Mars would vary from a minimum of 0.5 AU to a maximum of 2.5 AU. Being that the orbits are elliptical and not precisely in one plane, the variations run from 0.35 to almost 3 AU.

Let us stick with the idealized model and ask ourselves what happens when the distance between us and Mars varies by a factor 5? The size varies then by the same factor, of course. That is why Mars can be as small as 5 arc-sec and as large as 25. The brightness varies by 5-squared (why?); it varies between -2.5 mag and $+1$ approximately.

Good Mars viewing dates were the last weeks in July and August and will be the last weeks in September (9/17 till 10/2), the Moon will be out of the way then. If you have to miss it, wait till Oct/Nov 2005. Mars will then max out at 21 arc-sec (it's now 25 arc-sec), but will be 30 degrees higher when at the meridian. It might then be even a better photo-op than now!

I have been experimenting with "stacking" images and selecting the best images out of several dozens. Atmospheric turbulences ruin the resolution of your images, but once in a while you luck into a quiet air pocket that permits a near perfect resolution. About 1 arc-sec definition is the best you can achieve. Stacking a dozen images carefully selected out of a bunch (taken by Kirsten James and me) yielded this photo on 8/20, the North Pole snow cap shows clearly:



Contact me, if you are interested in the details of stacking and enhancing images. I did send an e-mail with details to some Starsplitters I knew were interested in astro-imaging.

Mars has two moons, Phobos and Deimos. It is a challenge to observe these two, as they are small, magnitudes only 10-11 approximately. Phobos is very close to Mars, only 1 Mars diameter away and circles around every 6 hrs! In due time, thousands of years, Phobos will be ripped apart due to the tidal influences from Mars' gravitational pull.

Observing and photographing Phobos is difficult. Mars is so bright and near that it is almost impossible to detect Phobos. The trick needed is to block Mars with a strip of blackened Aluminum foil or filter-material affixed in the focal plane of the eyepiece. Easier said than done! I tried with a 1 mm strip of foil glued to the baffle disc of my 7mm eyepiece. No luck; internal reflections and an imperfect focus allowed Mars to mask its moons from me. I tried gluing a sector of some blue filter film that I got from Mark G, but the material thickness of the filter was too thick and blurred a ring around my Mars-image, preventing me from seeing anything. I'll be trying again with a skinny strip of extra thin and blackened foil in a 10 mm Ortho eyepiece, very carefully placed in the

focal plane this time. I just tried this on 8/27 at 11:45, Deimos I got, but Phobos I could not get (yet). If any reader has other tricks to suggest, e-mail me! I'll be very appreciative if you have something up your sleeve that works.

For the positions of Phobos and Deimos relative to Mars, check our StarryNight3 program first. You have to know precisely where to look in order to have even a chance of finding them.

Demonstrations

Hot weather and mosquitoes have not limited the interest in our demo-nights. Even the late hours required to get sufficient darkness has not dampened the enthusiasm. Some visitors looked a bit scared when the coyotes start howling, but nearly all loved that sound after a while.

Coyotes are small, maybe 30 lbs max, and very shy. Rarely will you be able to spot one, but if you happen to have a IR night scope, try it! Take a look in the entrance-office of the Park, a stuffed coyote can be seen there as well as a wolf. Relative to the wolf, the coyote looks almost cuddly.

Check our demo schedule, copies are on our web site and in the Park Office. Make a call to the Park Office (608 996-2261) to be sure that weather conditions are OK.

Bring a jacket, mosquito-repellant, red flashlight and your binoculars. We have a few "loaners", but usually not enough.

Interesting Fall Astronomical Objects

The Fall is ideal for stargazers; the mosquitoes are getting lost and the darkness comes at nice hours, especially after ending DST on Oct 26. Humidity drops to enjoyable levels too (usually) so that nothing starts dripping and fogging over after one hour of observing. Just don't forget to dress a bit warmer, the temperature drops also. A drop of 20 degrees in a few hours is par for the course.

Listing only a few of the many fine objects:

Andromeda has its M31 (004041, that is 00 h 40' RA and 41 degrees DEC, an often used designation, giving the approximate location), "Great Nebula", a beautiful and bright spiral. Gamma, γ , is the bright yellow-purple double; γ is of mag 2.1 and is easily found (02 01 42); its double is 5.4 and close by, only 10 sec apart.

Aries features a triple that you should try. Pi, π , is a 4.9 mag star you should see with the naked eye when viewing is good (desig. 024717; getting used to it now?). One of the triples is only 3 sec apart, the other 24, but both are dim, mags 9 and 10).

“30” is a double, a very nice yellow and gray/blue pair (desig. 023424), about mag 7.

“33” is another double, one 5.5 the other only 9, topaz and green (023727).

Both doubles are an easy half arc-minute apart.

Cassiopeia (you cannot miss that W) has its M52, a very nice open cluster. Just extend the right leg of the W by its length and there it is (232261), mag 7. Half way the W's left leg, a bit to the left, you can find NGC 663, another beautiful open cluster.

Cepheus has nice doubles. δ , delta, yellow and blue, and Σ 2840, greenish and blue, are my favorites (desigs 222858 and 215056 respectively). U-Cephei is a variable star with a short cycle, only 60 hours! Its mag cycles from 6.5 to 10, easily noticeable from one night to the next.

Cygnus' second brightest star, β , or Albireo, is the nicest double of all doubles, bright, mag 3 and 5, golden and blue. It is the swan's head at the end of its long neck. Another nice color duo is, ψ , (195552), mag 5 and 7.5, white and lilac/blue. M39 is its bright open cluster, mag 5 and at 213048.

Lacerta, the lizard, is a small and faint constellation, just east of the Swan, that is hard to pin-point for beginners. It has a nice quadruple, worthy to look up (desig 223439, or more precise 22336+3923, remember 22 h RA, 33.6' and DEC North 39 degrees 23'), mags 6, 6.5, 8 and 10.

Lyra features the Ring Nebula, M57, easy to find, half way the lower leg of the trapezium hanging from Vega, that very bright star. It is a small ring, planetary nebula, only mag 9, but shows up beautifully in our Celestron and Meade. Aim also to ϵ , the famous quadruple, or double-double (the one, ie 4, just 1.5 degrees to the NE of Vega) and ζ , the one just below Vega, a double, topaz and greenish, mags 4.5 and 5.5. Try hard to find RR-Lyrae, the well-known pulsating star. It varies in 6 hours from 7 to 8 mag (pulsating period 0.57 day). You can notice the variation in two to three hours. Try it! Stars of this type are used for distance determination as they have a certain absolute brightness depending on its pulsating period.

Perseus should be visited, because of its double-cluster, NGC 869-884 (desigs 021657 and 022057). M34 and 76 can be found here too. M34 is the bright open cluster, mag 5.5 and at 023943.

Triangulum is the small upside down triangle east of Andromeda. It has M33, a large spiral galaxy just west of the lower tip of the triangle. The yellow and blue double, iota, ι , is rather bright, 5 and 6, only 4 arc-sec apart and nice.

Vulpecula (the fox) has **the** dumbbell, M27. Mag is 7.5, desig 195822 and use a 24mm – 40 mm eyepiece.

A little farther south, or lower, we have:

Aquarius with M2, a fine globular cluster, mag 6 at (2131-01, the – sign is for South, sometimes printed as 2131**01**). While you're in AQR look for M 72 and 73. Another very nice planetary nebula, the Saturn Nebula, is NGC 7009, 2102-12. Some colorful doubles are: ζ , greenish-yellowish, both about 4.5 mag (222600) and close; "41", topaz-blue, 5.5 and 7.5 mag, located at 2211-21; "94" pale yellow and bluish (2316-14) and "107", mags 6 and 7 (2343-19).

Capricornus has the favorite M30, a very nice open cluster, mag 8 at 2138-23. I like the double, σ , a white and pale blue pair, mags 6 and 6.5 at 2027-19. A close double is ρ , mags 5 and 10 and only 2 arc-sec apart, yellow and purple, not easy but worth the trouble trying to find with the Celestron at 2026-18.

Cetus parks its spiral galaxy, M77, a few degrees NE of Mira. M77 has a mag of 9 and is at 024000. A very nice and bright double is γ , with its impossible name Alkaffaljidhina (or something close to it), mags 3.5 and 6 at 024003; only 3 arc-sec apart and yellow/blue.

Delphinus and really looking a bit like a dolphin jumping upward, features two doubles, α , mags 4 and 12, rather far apart, $\frac{3}{4}$ arc-min, yellow/blue-green (find that little one!) and γ , mags 4.5/5.5, an easy 11 arc-sec apart (204416).

Equuleus (if you can make a little horse out of this tell me how) is known for its double, λ , two white ones of equal mag, 7, and close at 3 arc-sec (210007). I use that pair to test binoculars.

Pegasus. Find M15, a bright globular, mag 5.2 at 212812. Try also to pinpoint the little circle, or oval, in Pisces, located 10 degrees below the center of the lower leg of Pegasus' "Great Square". The diameter of the "Cirlet" is about 5 degrees. It consists of 7 faint stars.

Pisces offers the spiral galaxy, M74. Mag is 10 at desig 013416. You find several doubles here, I like the bright double, α , mag 4 and 5, close at 2 arc-sec separation and blue/green (015903). This double is supposed to be a good check for blue/green color-blindness; try it.

Get your star-map, mark the locations of your projects of interest and make an observing plan. Take into account the date, time and place and check on the viewing quality that can be expected that night. If needed, check the Primers "Where the heck is that...*?" and "Highways in the Sky". Have fun!

Clear nights and carpe noctem (don't forget that sweater).